

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

December 2000

The primary metals leading index posted its sixth decline in 7 months in November, with the leading index trend offering no evidence that the decline in industry activity that began earlier in the year will end soon. The growth rate of the metals price leading index reached a 5-year low in October, suggesting that growth in most metal prices will either be weak or negative in the near term.

Following a revised drop of 1.6% in October, the **primary metals leading index** edged down 0.1% in November to 123.3 from a revised 123.4 in October, while the index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, moved up to -6.0% from a revised -6.7% in October. Only four of eight components were available in time for its calculation, so the November primary metals leading index should be considered preliminary.

Three index components, the JOC-ECRI metals price index growth rate, the length of the average workweek in primary metals establishments, and the Purchasing Managers' Index, moved down in November. However, a strong increase in the S&P stock price index for diversified machinery companies nearly offset the decreases in the other three available components. Normally, a leading index growth rate below -1.0% signals a downward trend for future growth in metals activity, and the growth rate of the leading index has been on a downward trend since January. It continues to signal a near-term decline in overall U.S. primary metals activity.

The primary metals leading index is one of 5 metal industry leading indexes, and there are 29 unique components in the 5 metal industry leading indexes. Twenty six of these components declined in October, the highest number of declining components in one month since 1980.

The **steel leading index** dropped 2.0% in October, the latest month for which it is available, falling to 105.3 from a revised 107.5 in September. Its 6-month smoothed growth rate fell to -9.0% from a revised -6.0% in September, marking the lowest growth rate for this index since the end of the last U.S. recession in 1991. The weakness in the latest leading index reflected poor performances among most of the index components, as all but one of the index's nine components moved lower. The largest negative contributions to the net decrease in the leading index came from the S&P stock price index for steel companies, the industrial production index for automotive products, and inflation-adjusted shipments of household appliances. The only

component in the steel leading index that increased in October was the index of new private housing units authorized by building permits. In fact, the housing permits index was also the only component that increased in October in the primary metals, aluminum mill products, and copper leading indexes.

The steel coincident index has been declining since March. The growth rate of the steel leading index suggests that industry activity will likely continue to decline in the coming months.

The **aluminum mill products leading index** dropped 1.7% in October, falling to 157.7 from a revised 160.4 in September. Meanwhile, the index's 6-month smoothed growth rate dipped to -0.8% from a revised 2.5% in September. New orders for aluminum mill products and the industrial production index for automotive products together accounted for over half the net decrease in the leading index. The growth rate of the aluminum mill products leading index, which has remained above -1.0% for most of this year, continues to suggest weak growth in industry activity in the months ahead.

The **primary aluminum leading index** fell 1.8% in October to 86.1 from 87.7 in September, and the index's 6-month smoothed growth rate dropped to -8.5% from a revised -6.2 in September. With the exception of a small increase in the industrial production index for aluminum sheet, plate, and foil, all of the leading index components decreased in October. The LME cash closing price for primary aluminum, the S&P stock price index for aluminum companies, and the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar made the largest negative contributions to the net decrease in the leading index. The growth rate of the primary aluminum leading index continues to indicate declining growth in U.S. primary aluminum activity over the next few months. (Tables and charts for the primary aluminum indexes are in a separate file.)

The **copper leading index** fell 2.4% in October to 124.1 from a revised 127.2 in September, and its 6-month smoothed growth

rate slumped to -6.8% from a revised -3.1% in September. The S&P stock price index for building materials companies was responsible for nearly half of the net decrease in the leading index. Stock prices for some of the companies in this index have been depressed as a result of liabilities related to asbestos litigation, causing the stock price index to lose over half its value since April 1998. Thus, the copper leading index may be giving an overly negative indication of future copper industry activity. Still, even without the stock price index, the other components in the leading index would have pushed it lower. The growth rate of the copper leading index points to a near-term decline in U.S. copper industry activity.

Metals Price Leading Index Growth Rate at 5-year Low

The **metals price leading index** fell 0.8% in October, moving down to 104.1 from a revised 104.9 in September. The index's 6-month smoothed growth rate also slipped, down to -5.2% from a revised -4.2% in September, its lowest growth rate since September 1995. All three index components that were available for October decreased.

The growth rates of the inflation-adjusted value of new orders for U.S. nonferrous metals and the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar accounted for most of the decrease, while the interest rate yield spread made a minor negative contribution. The fourth index component, the growth rate of the Economic Cycle Research Institute's 16-Country Long Leading Index, moved lower in September, the latest month for which it is available.

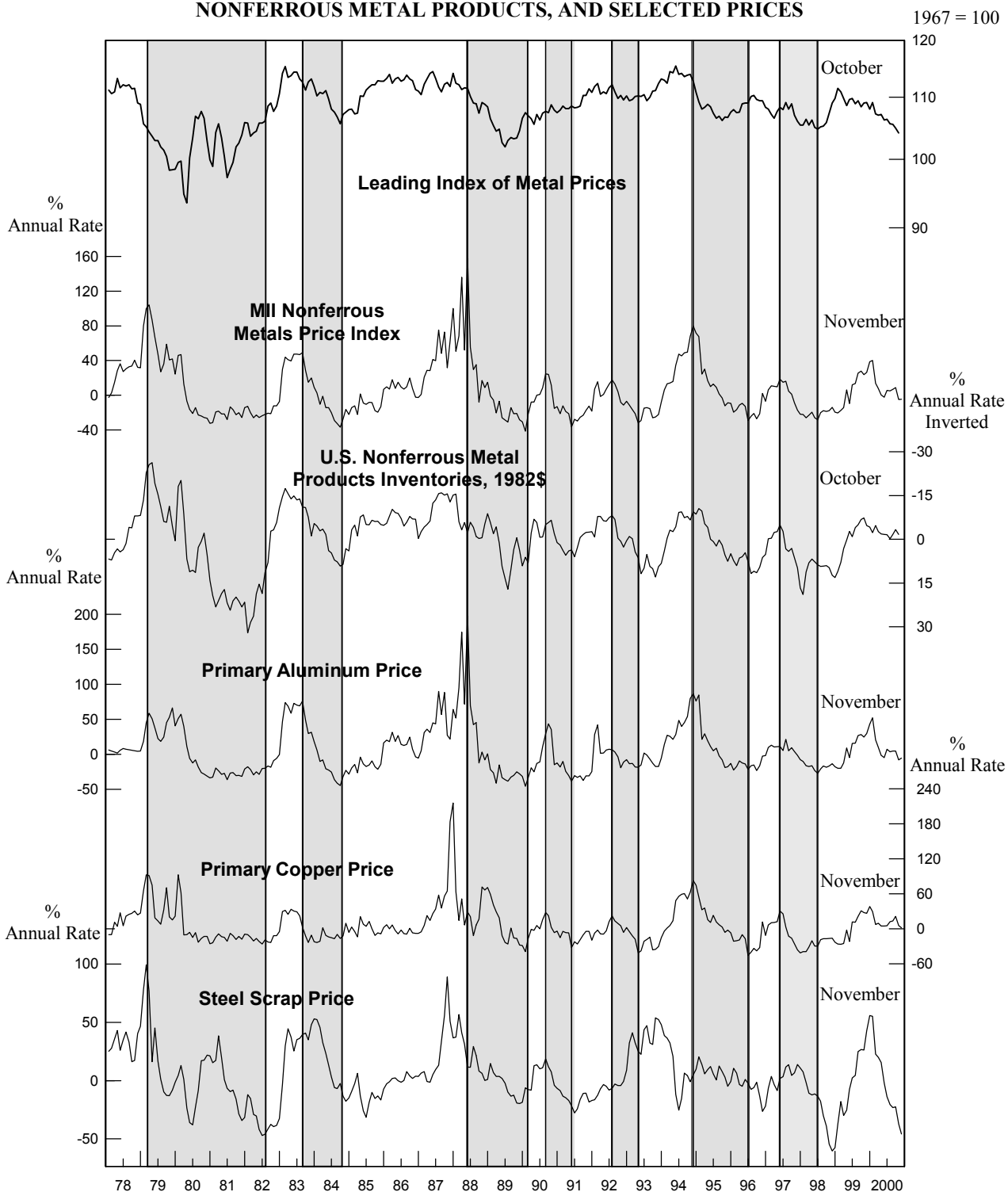
The 6-month smoothed growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories moved up in October to -1.7% from a revised -3.3% in September, indicating an increase in metal products inventories. This indicator, which tends to move inversely with metal price growth, has generally been moving higher in the past year.

The metals price leading index, a measure of the demand for metals, continues to signal weak or negative growth in most metal prices in the coming months. This signal is echoed by the growth rate for U.S. nonferrous metal products inventories, a measure of the supply of metals.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
1999						
October	109.0r	23.8	-7.3	24.4	28.0	26.2
November	109.1	26.6	-4.7	29.4	26.5	42.7
December	108.0r	38.6	-4.2	42.7	38.3	55.8
2000						
January	109.1r	40.1	-2.3	52.1	29.7	55.2
February	107.2	13.7	-4.7	20.6	7.6	22.7
March	107.0	7.8	-2.6	9.6	9.8	19.8
April	107.1r	0.4	-1.8	-1.7	4.9	15.7
May	106.2r	-2.3	-1.7	-4.9	4.9	-1.9
June	106.3r	5.6	-1.6r	6.9	5.2	-13.7
July	105.6r	5.2	-0.2	3.3	12.4	-20.5
August	105.5r	6.7	-1.7r	4.4	13.9	-23.2
September	104.9r	9.0	-3.3r	4.5	21.7	-22.4
October	104.1	-4.8	-1.7	-8.4	5.7	-37.0
November	NA	-4.6	NA	-5.7	1.8	-45.6
NA: Not available r: Revised						
Note:	The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metals, the Economic Cycle Research Institute's 16-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.					
Sources:	U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.					

**CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES**



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
December	130.5r	3.0	115.7r	4.2
2000				
January	131.6r	4.0	116.0r	4.1
February	128.3r	-1.5	115.6r	2.8
March	127.9r	-2.4r	116.4r	3.4r
April	129.2r	-0.6r	116.8r	3.6
May	127.4r	-3.3	115.9r	1.5r
June	126.2r	-4.9	116.3r	1.6
July	125.4r	-5.5r	116.2r	1.1r
August	124.8r	-5.9	115.3r	-0.6
September	125.4r	-4.4r	114.8r	-1.5r
October	123.4r	-6.7r	114.3	-2.3
November	123.3	-6.0	NA	NA

NA: Not available r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	October	November
1. Average weekly hours, primary metals (SIC 33)	0.0r	-0.5
2. S&P stock price index, machinery, diversified	-0.6r	1.1
3. Ratio of price to unit labor cost (SIC 33)	-0.3	NA
4. JOC-ECRI metals price index growth rate	-0.5r	-0.6
5. New orders, primary metals, (SIC 33) 1982\$	-0.1	NA
6. Index of new private housing units authorized by permit	0.1	NA
7. Growth rate of U.S. M2 money supply, 1996\$	-0.1	NA
8. Purchasing Managers' Index	-0.2r	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-1.7r	-0.2
Coincident Index	September	October
1. Industrial production index, primary metals (SIC 33)	0.0r	-0.4
2. Total employee hours, primary metals (SIC 33)	-0.3r	0.0
3. Value of shipments, primary metals, (SIC 33) 1982\$	-0.3r	-0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.5r	-0.4

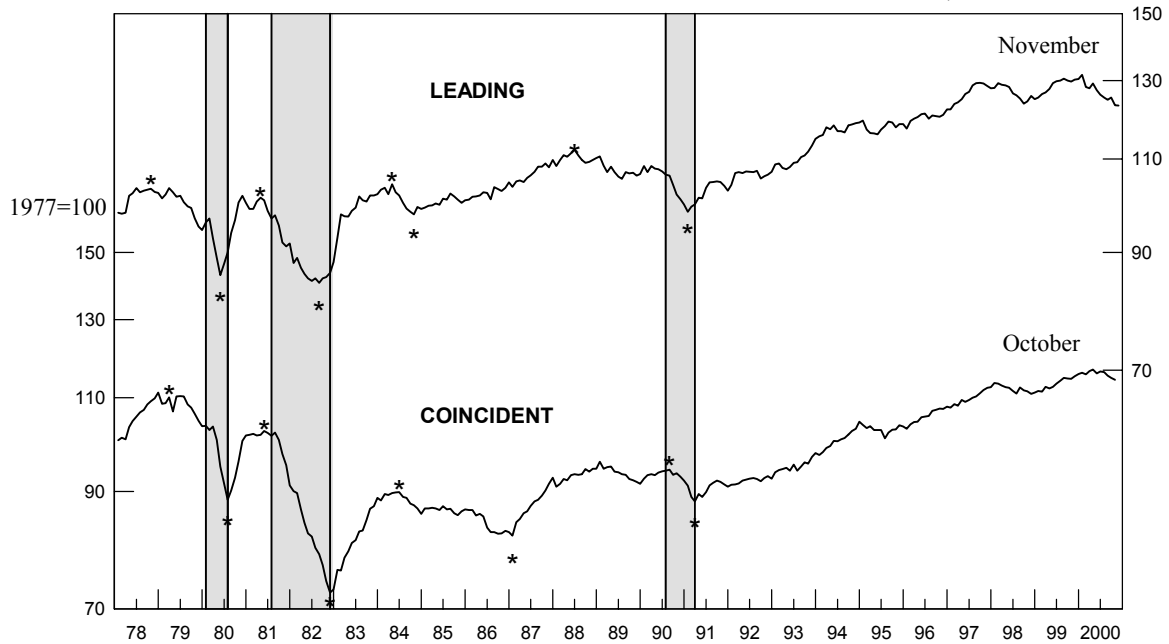
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available r: Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

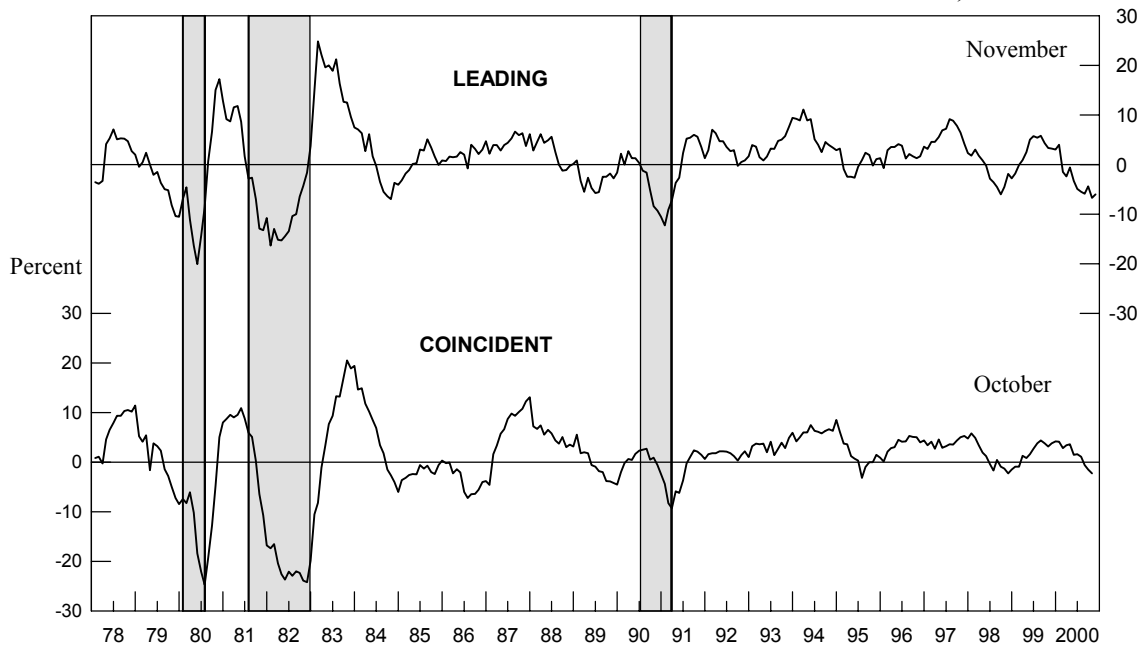
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1978-2000 1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1978-2000 Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
November	113.5r	3.0r	103.2r	6.2r
December	113.6r	2.6r	103.3r	5.5r
2000				
January	114.5r	3.3	103.4r	4.7r
February	112.1r	-1.1r	103.4r	4.0r
March	111.6r	-1.9r	104.0	4.2
April	111.1r	-2.8r	103.4r	2.3
May	110.1r	-4.3r	103.2r	1.5
June	108.8r	-6.1r	103.5r	1.5r
July	107.3r	-8.0r	103.1r	0.3r
August	107.3r	-7.2r	102.5r	-1.1r
September	107.5r	-6.0r	102.2r	-1.7r
October	105.3	-9.0	101.6	-2.7

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	September	October
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.1	-0.2
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982\$, (SIC 331)	0.0r	-0.2
3. Shipments of household appliances, 1982\$	0.2r	-0.4
4. S&P stock price index, steel companies	-0.5	-0.5
5. Industrial production index for automotive products	0.1	-0.4
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	0.0	-0.2
7. Index of new private housing units authorized by permit	0.1	0.1
8. Growth rate of U.S. M2 money supply, 1996\$	0.1	-0.1
9. Purchasing Managers' Index	0.1	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	-2.1
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	0.2r	-0.6
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982\$	-0.5	0.1
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	-0.1r	-0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.3r	-0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1978-2000

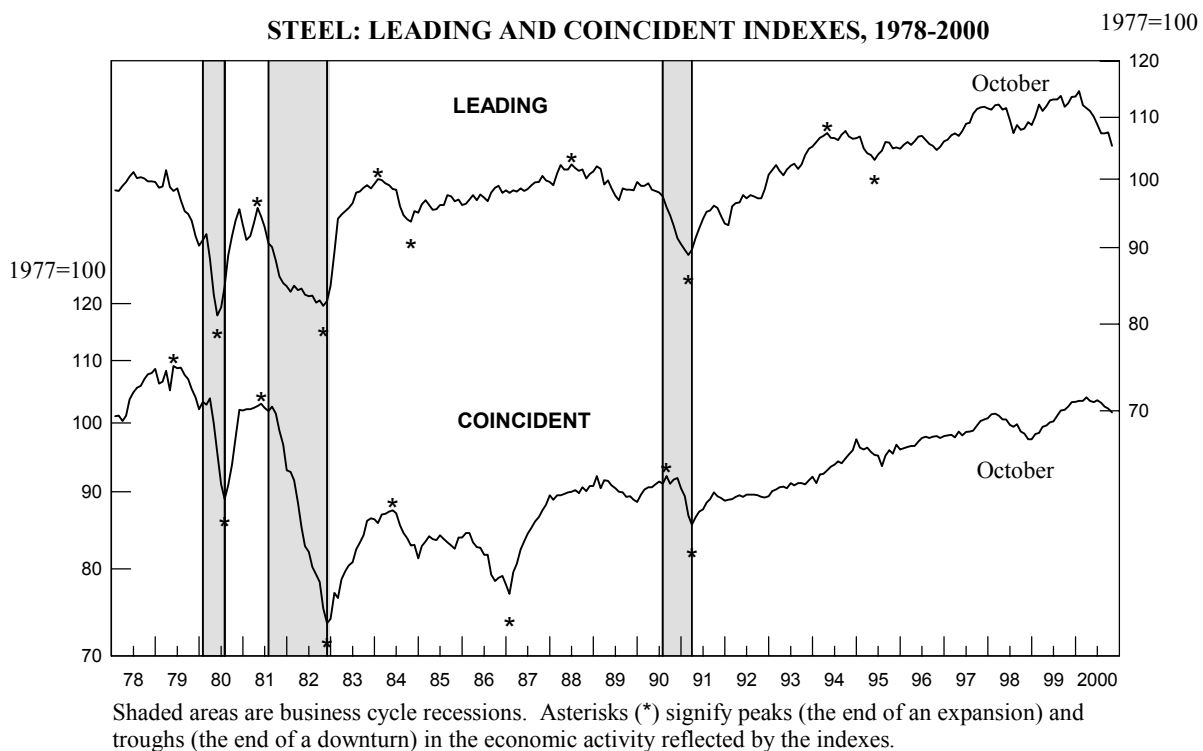


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1978-2000

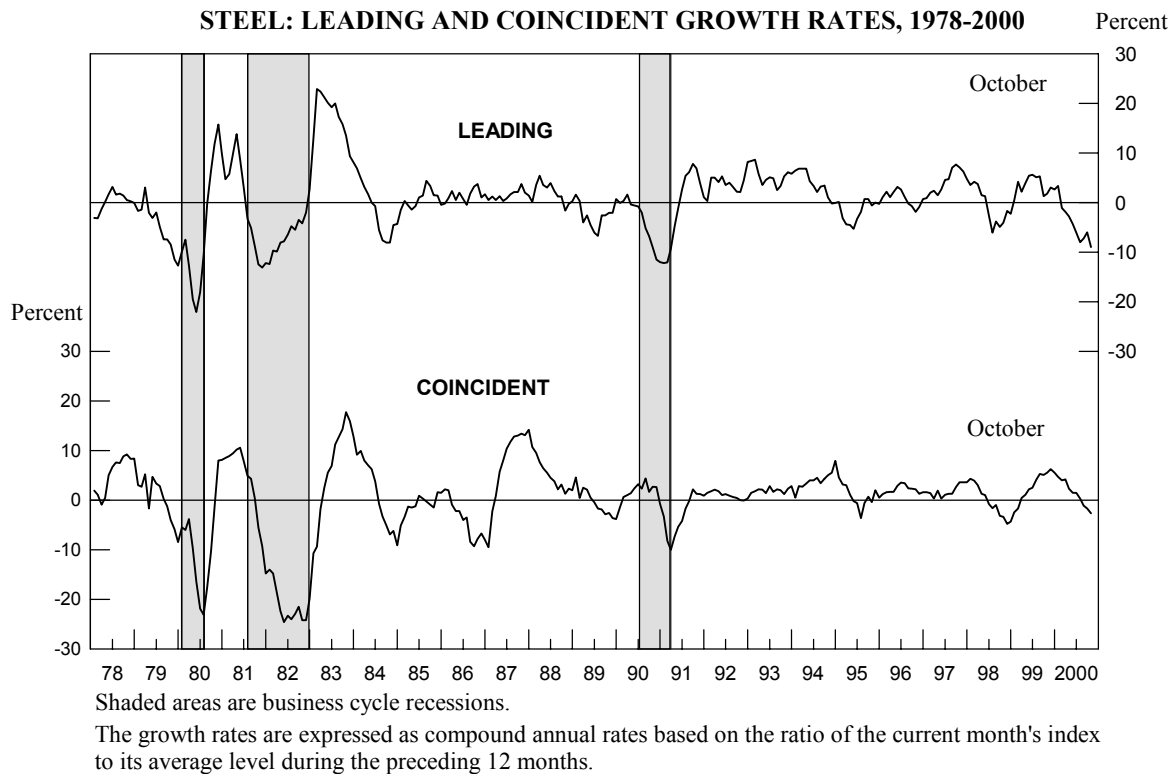


Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
November	156.4r	-0.9r	141.1r	0.1r
December	158.3r	1.1r	143.2r	2.5r
2000				
January	159.9r	2.7	143.2r	2.1r
February	159.4r	1.7r	143.0r	1.5r
March	160.0r	2.0r	143.0r	0.9r
April	160.9r	2.7	144.7r	2.8r
May	158.3r	-0.7r	144.2r	1.7r
June	158.0r	-1.0	142.5r	-0.8r
July	154.6r	-4.7r	144.0r	1.2
August	158.2r	-0.2r	142.4r	-1.1r
September	160.4r	2.5r	141.2r	-2.4r
October	157.7	-0.8	144.2	1.7

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

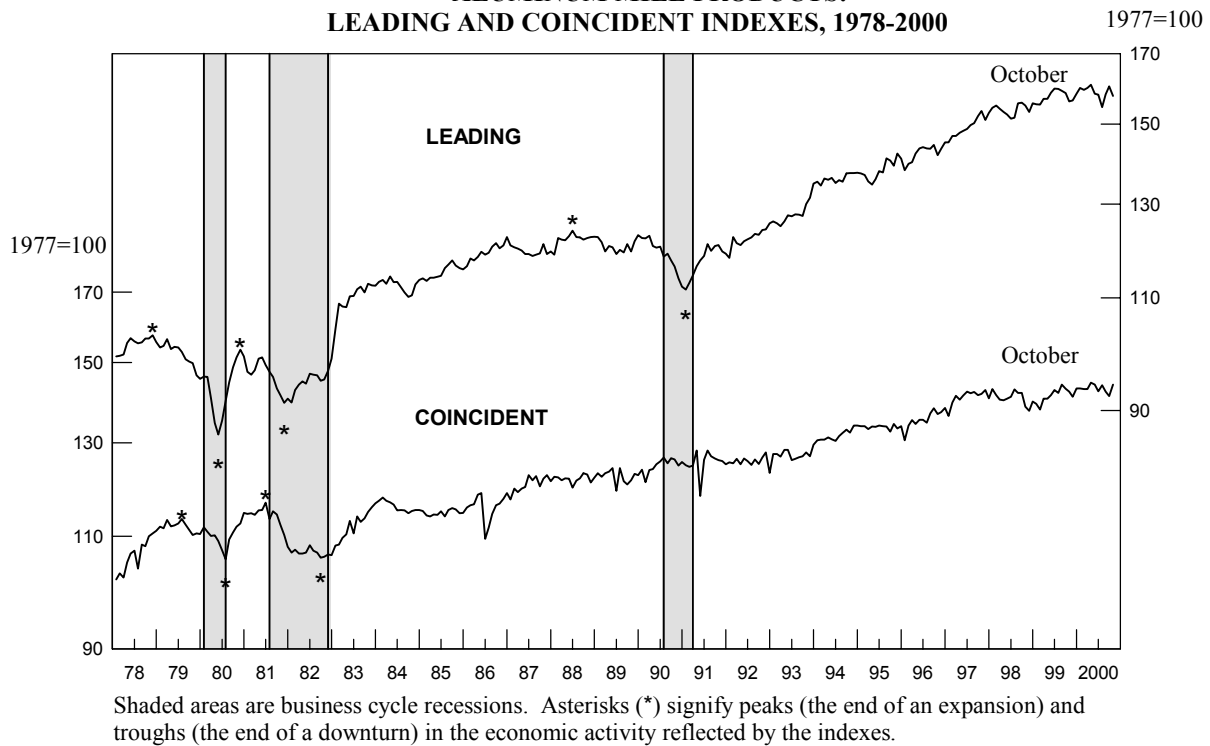
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	September	October
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	-0.3	-0.1
2. Index of new private housing units authorized by permit	0.1	0.1
3. Industrial production index for automotive products	0.2	-0.5
4. Construction contracts, commercial and industrial (square feet)	0.9	-0.4
5. Net new orders for aluminum mill products (pounds)	0.2	-0.6
6. Growth rate of U.S. M2 money supply, 1996\$	0.1	-0.1
7. Purchasing Managers' Index	0.1	-0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	1.4	-1.8
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	-0.1r	0.0
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	-0.9	1.9
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	-0.8r	-2.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

r: Revised

**CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1978-2000**



**CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1978-2000**

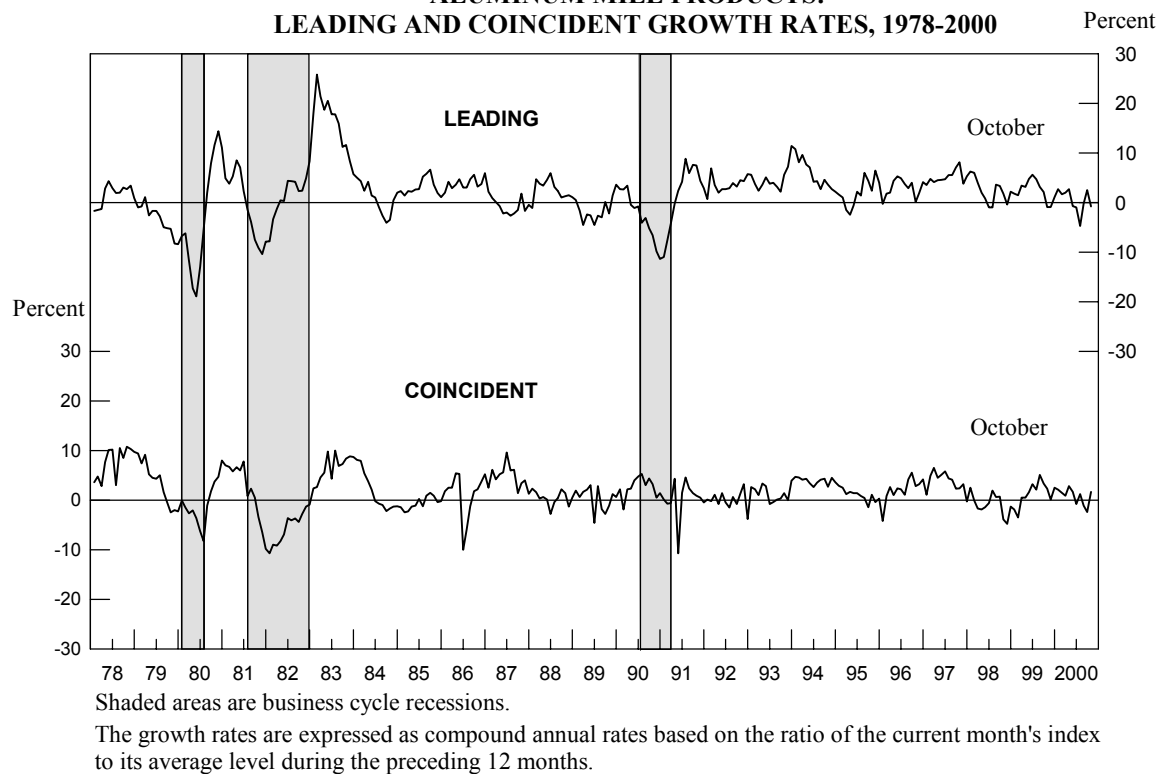


Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
November	130.5	-0.7	121.6r	-5.7r
December	130.0	-1.5	122.3r	-3.9r
2000				
January	131.2	0.1	120.8r	-5.3r
February	128.1	-4.2	122.6r	-2.1r
March	128.2	-3.9	122.8r	-1.3
April	129.2	-2.5	120.9r	-3.6r
May	129.1	-2.5	123.3r	0.7r
June	128.0	-3.9	122.8r	0.1r
July	127.2	-4.5	121.6r	-1.5r
August	127.0	-4.0	121.2r	-1.6r
September	127.2r	-3.1r	121.2r	-1.3r
October	124.1	-6.8	121.5	-0.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

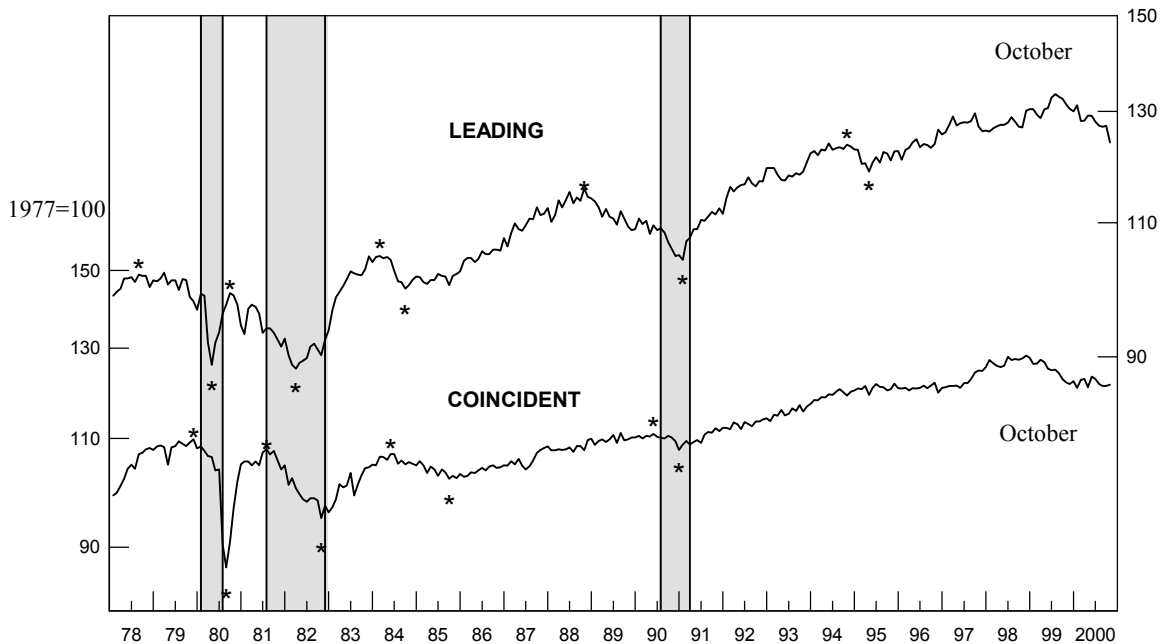
Leading Index	September	October
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	-0.1	-0.2
2. New orders, nonferrous and other primary metals, 1982\$	0.2	-0.2
3. S&P stock price index, building materials companies	-0.5	-1.2
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.3	-0.6
5. LME spot price of primary copper	0.2	-0.3
6. Index of new private housing units authorized by permit	0.1	0.1
7. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.0	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	-2.4
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	0.0r	0.7
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.2r	-0.6
3. Copper refiners' shipments (short tons)	-0.3	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0r	0.2

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, Census Bureau and U.S. Geological Survey; 5, London Metal Exchange; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 5, and 7 of the leading index.

r: Revised NA: Not available

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1978-2000

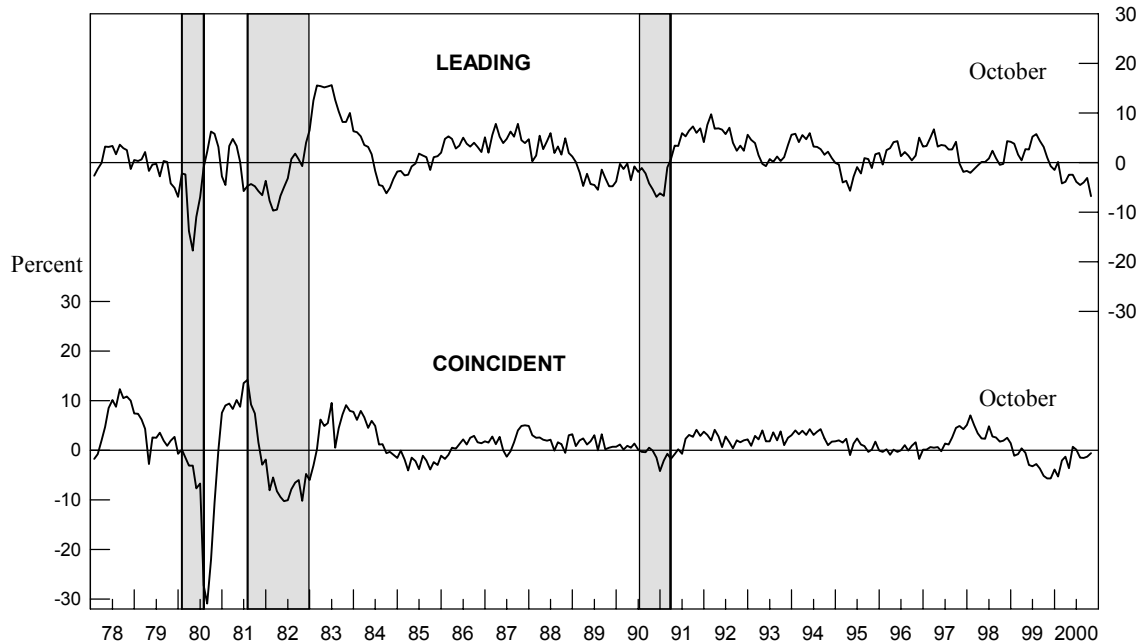
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1978-2000

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Four of the metal industry coincident indexes, those for primary metals, steel, primary aluminum, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. The coincident index for copper is a blend of two different copper industries, primary smelting and refining of copper and rolling, drawing, and extruding of copper.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals and 8 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

¹Business Cycle Indicators, A monthly report from The Conference Board (March 1996).

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EST, Friday, January 19. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

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